1	1. (Thrice Amended) A method for detecting a threshold temperature in an
2	integrated circuit comprising the steps of:
3	generating a voltage reference that is substantially independent of a
4	temperature of the integrated circuit;
5	receiving at least one programmable input specifying a value
6	corresponding to a threshold temperature for the integrated circuit;
7	generating a sensing voltage that varies substantially linearly with the
8	temperature of the integrated circuit;
9	scaling the sensing voltage in accordance with the value to generate a
10	comparison voltage, wherein the comparison voltage is substantially equal to
11	the voltage reference when the temperature of the integrated circuit is
12	substantially the same as the threshold temperature; and
13	generating a signal when a difference between the comparison voltage
14	and the voltage reference indicates the integrated circuit has attained said
15	threshold temperature.
16	[generating a voltage reference that is substantially constant over a
17	range of temperatures of said integrated circuit;
18	receiving at least one programmable input that specifies a threshold
19	temperature for said integrated circuit;
20	generating a sensing voltage wherein said sensing voltage amplitude
21	exhibits a substantially linear relationship with said temperature of said
22	integrated circuit;
23	generating a scale factor based on said programmable input;



scaling said sensing voltage based on said scaling factor to generate a		
comparison voltage such that when said integrated circuit attains said		
threshold temperature said comparison voltage is substantially equal to said		
voltage reference;		
comparing said voltage reference to said comparison voltage; and		
generating a signal when said comparison voltage exceeds said voltage		
reference to indicate said integrated circuit temperature attained said		
threshold temperature.]		
2. (Twice Amended) The method of claim 1 wherein the step of generating		
the voltage reference further comprises the step of generating a silicon		
bandgap voltage reference. [as claimed in claim 1 further comprising the step		
of programming a threshold temperature by specifying said programmable		
input.]		
3. (Twice Amended) The method of claim 1 wherein the step of generating		
the sensing voltage further comprises the step of generating a base-to-emitter		
voltage (Vbe) from a bipolar transistor. [as claimed in claim 2 wherein:		
the step of generating a constant voltage reference comprises the step		



the step of generating a sensing voltage comprises the step of

generating a base to emitter voltage (Vbe) from a bipolar transistor.]

of generating a silicon bandgap voltage reference; and

- 1 4. (Twice Amended) The method of claim 3 wherein the step of scaling the
- 2 sensing voltage further comprises the step of selecting a bias of the bipolar
- 3 transistor in accordance with the value.
- 4 [as claimed in claim 3 wherein the step of scaling said sensing voltage
- 5 comprises the step of providing a plurality of resistive elements, wherein a
- 6 first resistive element is coupled from the base to the collector of said bipolar
- 7 transistor, and a second resistive element is coupled from the base of said
- 8 bipolar transistor to ground, wherein said first resistive element and said
- 9 second resistive element generate a scale factor for scaling said sensing
- 10 voltage.]
- 5. (Twice Amended) The method of claim 4 further comprising the steps of:
- 2 providing a first resistive element coupled to a base and a collector of
- 3 the bipolar transistor;
- 4 providing a plurality of series coupled resistors to form a second
- 5 <u>resistive element coupled to the base and an emitter of the bipolar transistor;</u>
- 6 and
- 5 shorting a combination of the plurality of series-coupled resistors in
- 8 accordance with the value to select the bias of the bipolar transistor.
- 9 [as claimed in claim 4 wherein the step of programming a threshold
- temperature by specifying a scale factor comprises the steps of:
- 11 coupling a plurality of resistors in series to generate said second
- 12 resistive element;



13	coupling, across each resistor in said second resistive element, a
14	transistor; and
15	selectively biasing each transistor so as to select a combination of said
16	resistors in said second resistive element to specify said scale factor for scaling
17	said sensing voltage.]
1	6. (Twice Amended) The method as claimed in claim 5 wherein [said] the
2	plurality of resistors comprises a plurality of binary weighted resistors.
1	7. (Twice Amended) The method as claimed in claim 1 wherein [said] the
2	integrated circuit comprises a microprocessor.
1	8. (Thrice Amended) An apparatus for detecting a threshold temperature in
2	an integrated circuit comprising:
3	voltage reference means for generating a voltage reference substantially
4	independent of a temperature of the integrated circuit;
5	at least one programmable input for receiving a value corresponding to
6	a threshold temperature of the integrated circuit;
7	temperature sensing means for generating a sensing voltage wherein
8	the sensing voltage varies substantially linearly with the temperature of the
9	integrated circuit, the temperature sensing means scaling the sensing voltage
10	in accordance with the value to generate a comparison voltage, wherein the



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comparison voltage is substantially equal to the voltage reference when the

integrated circuit attains the threshold temperature; and

comparison means coupled to the temperature sensing means and the voltage reference means, wherein the comparison means generates a signal when the comparison voltage exceeds the voltage reference to indicate the integrated circuit temperature attained the threshold temperature. Ivoltage reference means for generating a voltage reference that is substantially constant over a range of temperatures of said integrated circuit; at least one programmable input for receiving a threshold temperature for said integrated circuit; temperature sensing means for generating a sensing voltage wherein said sensing voltage amplitude exhibits a substantially linear relationship with said temperature of said integrated circuit, said temperature sensing means including scaling means generating a scale factor based on said programmable input and for scaling said sensing voltage in accordance with said scale factor to generate a comparison voltage such that when said integrated circuit attains said threshold temperature said comparison voltage is substantially equal to said voltage reference; and comparison means coupled to said temperature sensing means and said voltage reference means for comparing said voltage reference to said

- said voltage reference means for comparing said voltage reference to said comparison voltage, and for generating a signal when said comparison voltage exceeds said voltage reference to indicate said integrated circuit temperature attained said threshold temperature.]
- 1 9. (Twice Amended) The apparatus of claim 8 wherein the voltage reference
- 2 <u>is a silicon bandgap voltage reference.</u> [The apparatus as claimed in claim 8
- 3 further comprising programming means for programming a threshold



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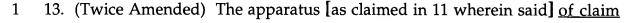
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- 4 temperature by specifying said programmable input a scale factor for scaling
- 5 said sensing voltage.]
- 1 10. (Twice Amended) The apparatus of claim 8 wherein the temperature
- 2 sensing means further comprises a bipolar transistor for generating a
- 3 <u>base-to-emitter voltage as the sensing voltage.</u>
- 4 [The apparatus as claimed in claim 9 wherein:
- 5 said voltage reference means generates a silicon bandgap voltage
- 6 reference; and
- said temperature sensing means comprises a bipolar transistor for generating a base to emitter voltage (Vbe) for said sensing voltage.]
- 1 11. (Twice Amended) The apparatus as claimed in claim 10 further
- 2 comprising a plurality of resistive elements, wherein a first resistive element
- 3 is coupled from a base to a collector of the bipolar transistor, and a second
- 4 resistive element is coupled from the base of said bipolar transistor to an
- 5 <u>emitter of the bipolar transistor.</u> [wherein said scaling means comprises a
- 6 plurality of resistive elements, wherein a first resistive element is coupled
- 7 from the base to the collector of said bipolar transistor, and a second resistive
- 8 element is coupled from the base of said bipolar transistor to ground, wherein
- 9 said first resistive element and said second resistive element generate a scale
- 10 factor for scaling said sensing voltage.]
- 1 12. (Twice Amended) The apparatus of claim 11 wherein the second resistive
- 2 element comprises a plurality of series-coupled resistors, wherein at least one



3	transistor is coupled across each of some of the plurality of resistors, wherein
4	a combination of the resistors is selected in accordance with the value.
5	[The apparatus as claimed in claim 11 wherein:
6	said second resistive element comprises at least one resistor;
7	said programming means comprises:
8	at least one transistor coupled across each resistor in said second
9	resistive element; and
10	biasing means for biasing each transistor so as to select a combination
11	of said resistors in said second resistive element to specify said scale factor for



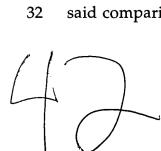
- 2 <u>11 wherein the</u> resistors comprise a plurality of binary weighted resistors.
- 1 14. (Twice Amended) The apparatus [as claimed in 8 wherein said] of claim 8
- 2 <u>wherein the</u> integrated circuit comprises a microprocessor.
- 1 15. (Twice Amended) An apparatus for detecting a threshold temperature in
- 2 an integrated circuit comprising:

scaling said sensing voltage.]

- 3 <u>a bandgap reference circuit providing a voltage reference substantially</u>
- 4 <u>independent of a temperature of the integrated circuit;</u>
- 5 <u>a bipolar transistor providing a base-to-emitter voltage (Vbe) as a</u>
- 6 sensing voltage, wherein the sensing voltage varies substantially linearly
- 7 with the temperature of the integrated circuit;



at least one programmable input receiving a value corresponding to a
threshold temperature for the integrated circuit;
a voltage divider coupled to the bipolar transistor, wherein the voltage
divider scales Vbe in accordance with the value to generate a comparison
voltage, wherein the comparison voltage is substantially equal to the voltage
reference when the temperature of the integrated circuit is substantially equal
to the threshold temperature; and
a comparator providing a signal when a difference between the
comparison voltage and the voltage reference indicates that the threshold
temperature has been attained.
[a silicon bandgap reference circuit that generates a silicon bandgap
voltage reference, wherein said silicon bandgap voltage reference is
substantially constant over a range of temperatures of said integrated circuit;
a bipolar transistor wherein a base to emitter voltage (Vbe) from said
bipolar transistor generates a temperature sensing voltage of said integrated
circuit;
at least one programmable input that receives a threshold temperature
for said integrated circuit;
a voltage divider circuit coupled to said bipolar transistor that scales
said Vbe to generate a comparison voltage such that when said integrated
circuit attains said threshold temperature, said comparison voltage is
substantially equal to said silicon bandgap voltage; and
a comparator coupled to said collector of said bipolar transistor and to
said voltage reference circuit that compares said silicon bandgap voltage to
said comparison voltage, and that generates a signal when said comparison



voltage exceeds said silicon bandgap voltage to indicate said integrated circuit

34 temperature attained said threshold temperature.]

1 16. (Twice Amended) The apparatus of claim 15 wherein the voltage divider

2 comprises a first resistive element coupled from a base to a collector of the

3 <u>bipolar transistor and a second resistive element coupled from the base to an</u>

4 emitter of the bipolar transistor. [as claimed in claim 15 wherein said voltage

5 divider circuit comprises a plurality of resistive elements, wherein a first

resistive element is coupled from the base to the collector of said bipolar

7 transistor, and a second resistive element is coupled from the base of said

8 bipolar transistor to ground, wherein said first resistive element and said

9 second resistive element generate a scale factor for scaling said Vbe.]

1 17. (Twice Amended) The apparatus of claim 16 further comprising:

2 <u>a plurality of series-coupled resistors forming the second resistive</u>

3 element; and

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4 a plurality of transistors, at least one of each of the plurality of

5 transistors coupled across one of the plurality of resistors, wherein the

6 plurality of transistors select a combination of resistors in accordance with the

7 value to provide a bias voltage for the bipolar transistor.

8 [The apparatus as claimed in claim 16 further comprising:

a plurality of resistors for said second resistive element;

a plurality of transistors coupled in parallel with each resistor; and



a plurality of programming voltages input to said transistors for biasing

said transistors so as to select a combination of said resistors in said second

13 resistive element to specify said scale factor for scaling said sensing voltage.]



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18. (Twice Amended) The apparatus [as claimed in 16 wherein said] of claim

2 <u>16</u> resistors comprise a plurality of binary weighted resistors.

1 19. (Twice Amended) The apparatus [as claimed in 15 wherein said] of claim

2 <u>15 wherein the</u> integrated circuit comprises a microprocessor.